

High Resolution VLBA Observations of NGC 4261

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The VLBA's high angular resolution at 22 and 43 GHz allows the nuclei of nearby radio galaxies to be imaged with very high linear resolution (a few hundred Schwarzschild radii or less for central black hole masses of $\sim 10^8 - 10^9 M_\odot$). This is the scale on which absorption by the dense ionized inner regions of nuclear accretion disk should be detected.

We present 8, 22, and 43 GHz VLBA images of the two-sided radio jets in NGC 4261 (2C370) with sub-parsec resolution, and derive constraints on the physical properties of the inner accretion disk. In addition, preliminary results from multi-epoch VLBA observations to detect proper motions in the jet and counterjet, and thus determine the orientation of the radio axis to our line of sight, may be available.

Our multi-frequency images show apparent absorption by a nearly edge-on disk at 8 GHz, but not evidence for absorption at 22 or 43 GHz. Assuming that this is due to a lower optical depth for free-free absorption at 22 and 43 GHz, we find an upper limit for the electron density of approximately $10^8 \sqrt{0.1/L} \text{ cm}^{-3}$, where L is the path length through the disk in pc. The disk inclination, and therefore the likely path length, will be better determined by the ongoing VLBA proper motions measurements.

This research was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.